

What is claimed is:

1. A method for monitoring a cement production process having a kiln, comprising  
    computing clinker production at the kiln output,  
    computing the cost of clinker based on the computed clinker production, and,  
    displaying at least one of the clinker production and the cost of clinker as a function of time.
2. A method according to claim 1, wherein computing clinker production further comprises,  
    measuring feed to the kiln,  
    measuring dust loss from the kiln, and,  
    computing the difference between the measured feed to the kiln and the dust loss from the kiln.
3. A method according to claim 2, wherein measuring feed to a kiln further includes measuring raw meal input to a kiln.
4. A method according to claim 2, wherein measuring feed to a kiln further includes measuring slurry input to a kiln.

5. A method according to claim 1, wherein computing the cost of clinker based on the computed clinker production further comprises measuring at least one of a kiln coal feed rate and a kiln non-coal fuel feed rate.

6. A method according to claim 1, wherein computing the cost of clinker based on the computed clinker production further comprises computing a credit based on waste fuel.

7. A method according to claim 1, further comprising,  
deriving a measure based on at least one of the computed clinker production and the computed cost of clinker,  
comparing the derived measure to a threshold, and,  
generating an alarm based on the comparison of the derived measure and the threshold.

8. A method for monitoring a cement processing operation, comprising

computing finish mill throughput,  
computing cement cost based on the computed finish mill throughput, and,

displaying at least one of the finish mill throughput and the cement cost as a function of time.

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9. A method according to claim 8, further comprising computing clinker production.

10. A method according to claim 9, further comprising computing the cost of clinker based on the computed clinker production.

11. A method according to claim 8, wherein computing finish mill throughput further comprises measuring an amount of clinker fed to the input of the finish mill.

12. A method according to claim 8, wherein computing cement cost based on the computed finish mill throughput further comprises measuring at least one of a gypsum feed rate, a clinker feed rate to the finish mill, and a grinding aide feed rate.

13. A method according to claim 8, further comprising,  
deriving a measure based on at least one of the computed finish mill throughput and the computed cement cost,  
comparing the derived measure to a threshold, and,  
generating an alarm based on the comparison of the derived measure and the threshold.

14. A system for measuring the efficiency of a kiln in a production process, the system comprising,

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at least one sensor to measure clinker production at the kiln output,

at least one sensor to measure at least one of a kiln coal feed rate and a kiln non-coal feed rate,

at least one processor module to accept the sensor outputs and process the sensor outputs, and,

at least one display module to display at least one of the processed sensor outputs as a function of time.

15. A system according to claim 14, wherein the sensors include at least one of a temperature sensor, a heat sensor, an oxygen sensor, a carbon monoxide sensor, a cooling fan rotation sensor, a power sensor, an air temperature sensor, a clinker temperature sensor, a secondary air temperature sensor, a cooler vent temperature sensor, an oil flow sensor, a fan speed sensor, and a damper sensor.

16. A system for measuring the efficiency of a finish mill in a cement production process, comprising,

at least one sensor to measure the clinker input to the finish mill

at least one sensor to measure at least one of a clinker feed rate, gypsum feed rate, and grinding aide feed rate,

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at least one processor module to accept the sensor outputs and process the sensor outputs, and,

at least one display module to display at least one of the processed sensor outputs as a function of time.

17. A system according to claim 16, further comprising a sensor to measure reject at the input to the finish mill.

18. A system according to claim 16, wherein the sensors include at least one of a temperature sensor, a power sensor, an energy sensor, and a water content sensor.

19. A control system for a cement production process having a kiln, comprising

at least one sensor to provide data related to feed to the kiln,

at least one sensor to provide data related to dust loss from the kiln, and,

a control processor to receive the data from the feed sensors and the dust loss sensors, compute a dynamic performance measure based on the feed to the kiln and the dust loss from the kiln, and compare the dynamic performance measure to a threshold.

20 A control system according to claim 19, further comprising,

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a display coupled to the data processing unit for displaying the dynamic performance measure.

21. A control system according to claim 19, wherein the control processor further includes instructions to cause the control processor to adjust the feed rate based on the dynamic performance measure.

22. A control system according to claim 19, wherein the at least one sensor to provide data related to the feed to the kiln further include at least one sensor to measure raw meal input to the kiln.

23. A control system according to claim 19, wherein the at least one sensor to provide data related to the feed to the kiln further includes at least one sensor to measure slurry input to the kiln.

24. A control system according to claim 19, further comprising at least one sensor to measure at least one of a kiln coal feed rate and a kiln non-coal feed rate.

<sup>25</sup>  
~~26~~. A control system for cement processing, comprising,

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at least one sensor to provide data related to finish mill throughput,

at least one sensor to provide data related to clinker production,

at least one sensor to measure at least one of a gypsum feed rate, a clinker feed rate to the finish mill, and a grinding aide feed rate, and

a control processor to collect data from the at least one finish mill sensor, the at least one clinker production sensor, and at least one of the gypsum feed rate sensor, clinker feed rate sensor, and grinding aide feed rate sensor, and compute a dynamic performance measure related based on the finish mill throughput and the clinker production.

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27. A control system according to claim <sup>25</sup>26, wherein the control processor further includes instructions to compare the dynamic performance measure to a threshold.

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28. A control system according to claim <sup>25</sup>26, further comprising, a display coupled to the data processing unit to display the dynamic performance measure.

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<sup>28</sup>  
~~29.~~ A control system according to claim <sup>25</sup>~~26~~, wherein the control processor includes instructions to modify at least one of the gypsum feed rate, clinker feed rate, and grinding aide feed rate.

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